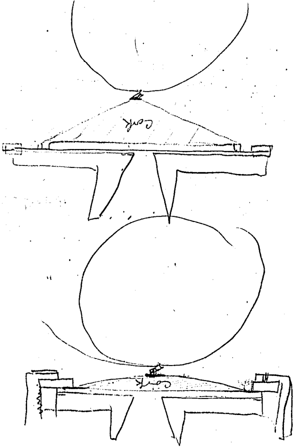
Notebook, N-99-01-05

This notebook was used by Edison during January 1899. Most of the book contains notes and drawings regarding improvements in cylinder phonograph recording and reproduction. There are also notes pertaining to iron ore milling and to cement. Near the end of the book are production estimates for a proposed cement plant and the draft of a speech given by telephone to the Massachusetts Institute of Technology. The pages are unnumbered, and several pages have been removed from the book. Approximately 180 pages have been used.

January 5/99



Reducing agts
Nitrites —

Hot solution ~~KOH de~~ of purpurin ~~to~~ in KOH
dissolves phosphorus without Evolution
of H, Orcin Reducer

Sulphide Hydrogen water — Phosphorus dissolved in air —
Barium Hydrate

Zinc dust in thick KOH water.

permanganate K for oxidation —
Oxalic acid

Selenide K Nitrous Ether
" Hydrogen
Sodium amalgam —

Telluride K. Olivil
Carbonate Soda Reducer
Baryta
" Ferrous Acetate, Nitrogen Sulphide

Sulfocyanate phenyl — Picric acid
Redr

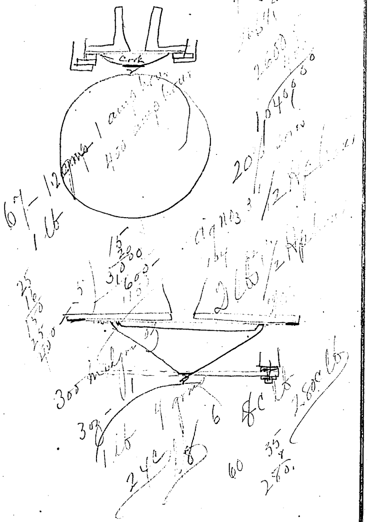
Oxychloride Phosphorus

oxdz. Hypochlorite Sodium

Ferri ferro Cy K pyrocatechin
Nitrite of amyl or oxyphenic

N-99-01-05

Jany 5/99 -


Cork
1 amp hour
400 amp hour
67 - 12 grms
1 lb
AgNO3
20
1040
2600
1/2 NH3
2 lbs 1/2 NH3
15
31600
25
300 milligr
3 oz
1 lb
4 grms
6
8C lbs
280C lbs
24C
60
35
280

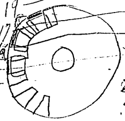
6 40

5 =
5 =
8 =
3 =
2 =
17 — 23
2 =
~~7~~
1 4

14
18
19
20
16
14
19
17
16
15

39 450
32 850
34 675
58 400
17 500
10 220
62 415
12 410
5840
5470
279231

3
5
4



365
15
1825
365
5475

18

12

5840
3
17520

365
17
2555
365
6205
2
12410

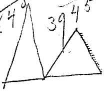
365
16
2190
365
5840
2
11680

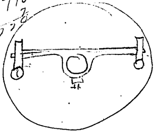
365
18
2920
365
6570
~~365~~ 32850
730
5840

365
14
1460
365
5110
2
10220

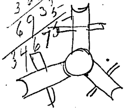
365

6575
6
39450



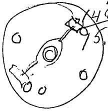


365
19
3285
365
6935
34675

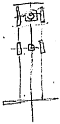


6935
9
62415

365
42
730
1460
15330



15330) 279231 (18,21
15330
125931
122640
32910
30660
22500



150
[illegible]

200

[illegible]

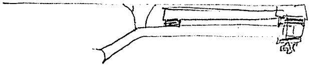
90/ 2500 lbs 1000 lbs

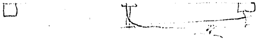
200 — [illegible]

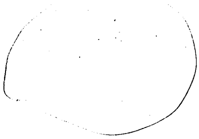
6 ft
1 [illegible] 6 ft [illegible]

3.80
544
24-0
564

Jany 5/99 –





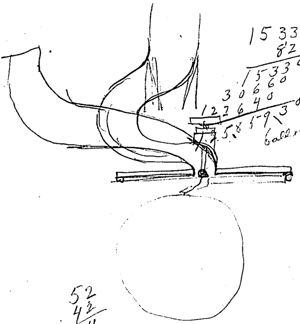


47.3
53
100.3

12585 days
2184
14769 – (47.3
312) 1248
2289
2184
950

Jany 5/99 18.21 hours

125850



15330~~0~~
821
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30660
122640
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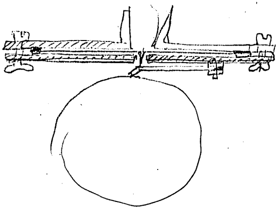
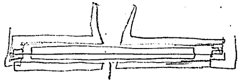
ball rubbe

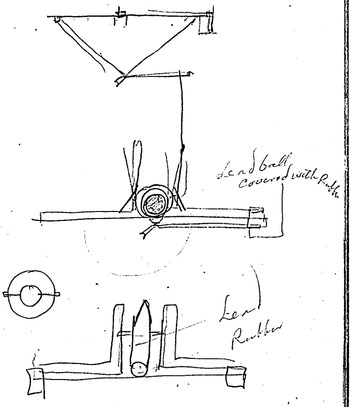
52
42
104
208
2184

Jan 5/99

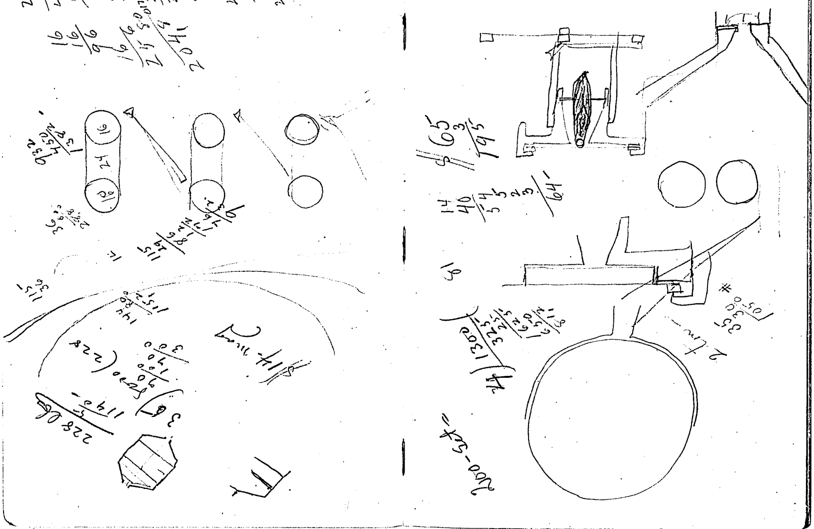




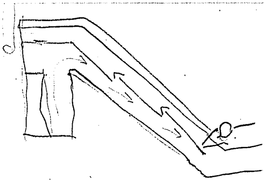
Jany 5/99

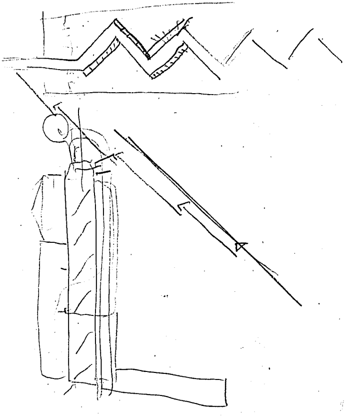

Lead ball
covered with Rubber
Lead
Rubber

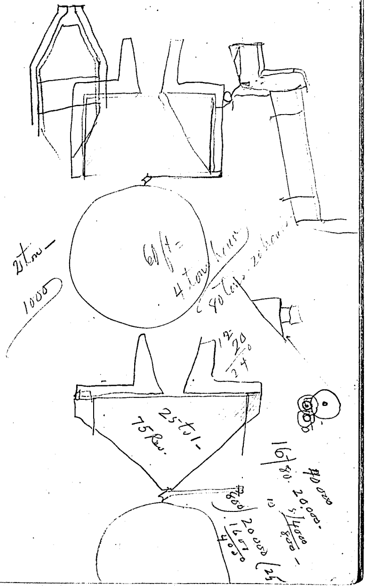
Jany 5, 99.



65
3
195
14
40
64
360-30t
2 line
335
16
24
16
204
228
114
38






2 ton—
1000
60 ft =
4 tons/hour
(40 tons 20 hours
12
20
240
25 tons
75 Rs.
16/80.
40 000
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#800)
20 000
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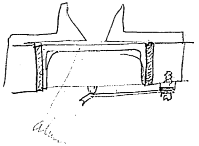
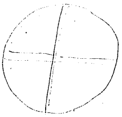
4000
(25

Jany 5/99





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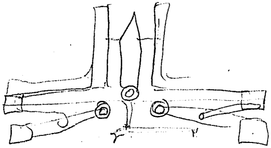
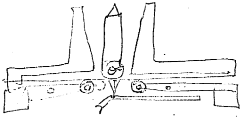
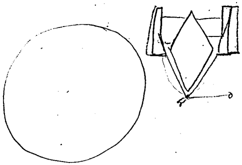
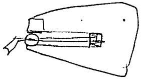


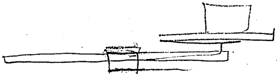


15000
20
300,000

Jany 5/99







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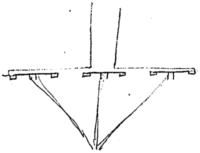
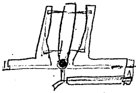


1800 –
3/180/60 HP
30



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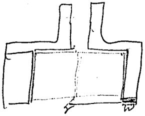
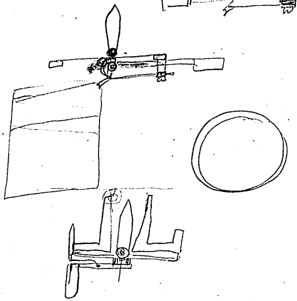
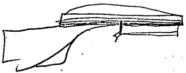
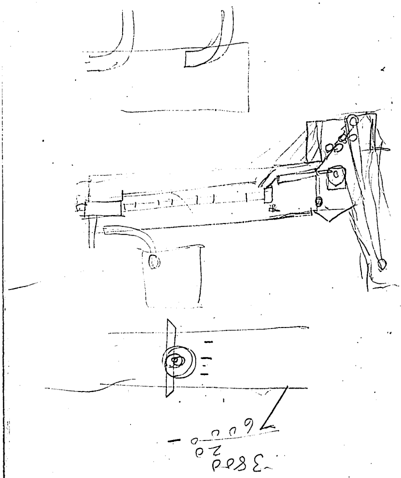
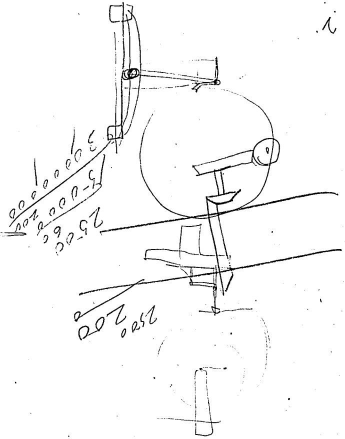







3800
20
76000

Jany 5/99


i
3000000
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200
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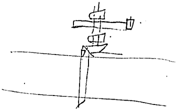
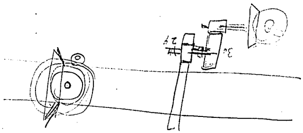
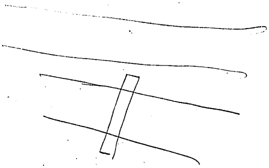
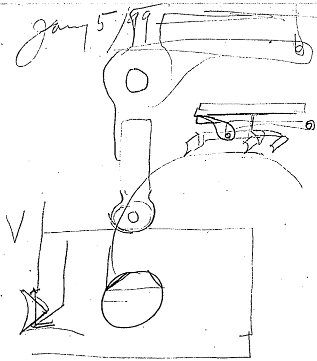
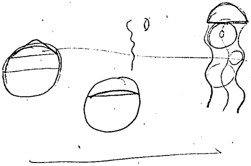


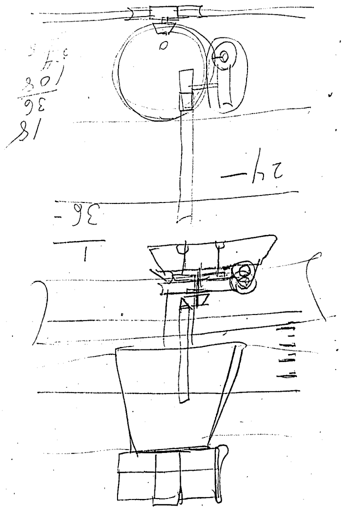




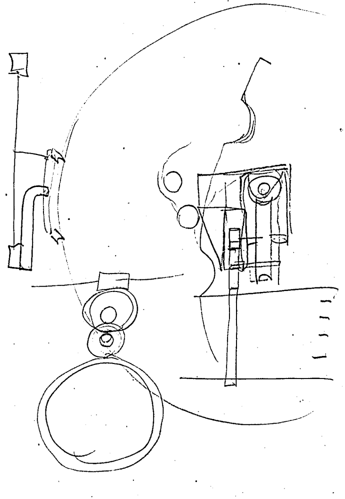
Jany 5 /99

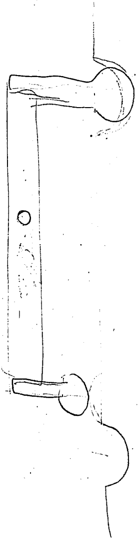





18
36
108
24 —
36 -
1

Jan 5 99





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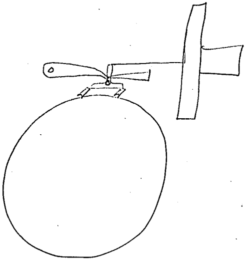

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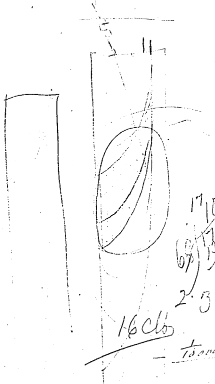


17
1000
68) 1760
1360
340
2.3 -

(2550
800
33

800 -

16 Cls

— 15000 —

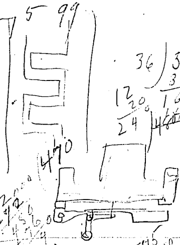
3" 3000 -

3" 4 lb

5 03 $3.00

10 inches for
cent —

Jany 5 99



36) 528' (140
36
168
144
40

12
20
24

470

450
78
528 —

150 lbs
4
600
144
115 - 2

78

680

3) 320
100

212

1600

205

575
800

1000

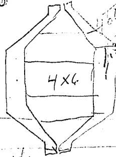
24

13
6
78

115
13
102
6
4) 612
153 - 350

400
53

1400



400

35 -

1600
2080
3700

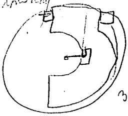
180 -

900 - 2 tons day

575

41 -
6
246 -
3
738

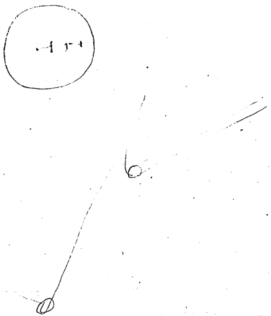
1400
2100
7000
2800
3500



43

350
76
2100
2450
2660

84 -



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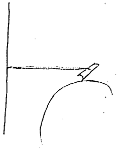
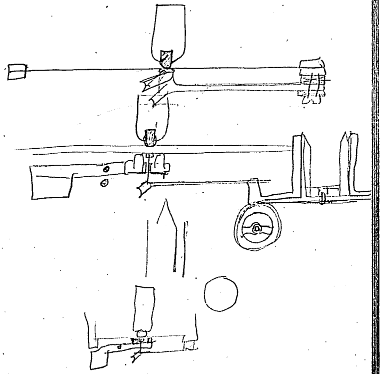
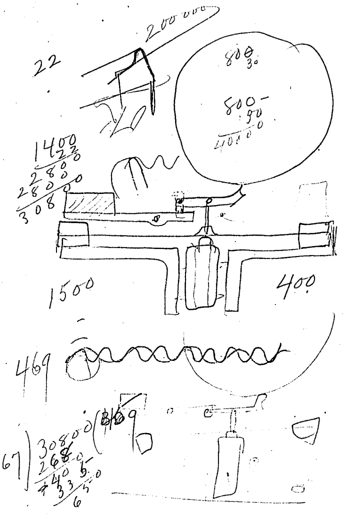


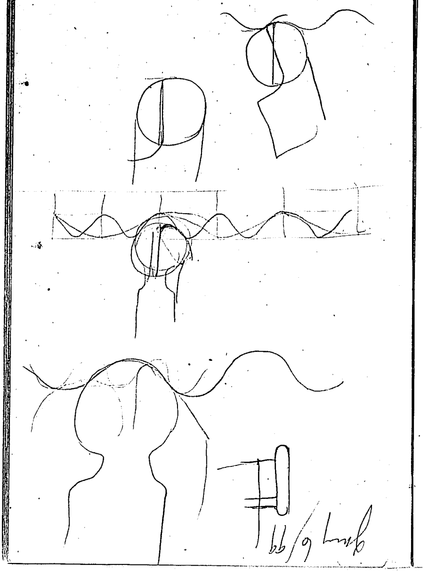



22
200 000
800 30
800-
90
40000
1400
220
2800
28000
308
1500
400
469
67) 30800 (469
268
400
335
6

Jerry 6/99 a

Savey Mill 1 + CP –
amsa foreman Mill 1
McGuti " CP –
Harry Bkg plant,
Balandini – Magneto, assay coal & oven
~~Ward Supt. Repairs~~
Cal foreman mac shop
Ward Master Mech
Bob – Mine –
Dan Smith, Mine foreman –

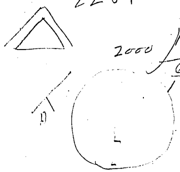
3 Hughes dryed = ? new Eng 6kr. – 4000
445 a belt – 800
New foundry 2000
Bruce Elev. 4000
6 Elev Belt Elev – 1000
800
Fan in STK House – #800
1000
New mag sep – 1000
fix mixers – Gal ovens – 600
Tighten 95 & 6 –
mix muck house new muck – 800
500
friction grants – 250
new plates 1st 36 –
Browning Crane – slow speed – 800
400
Spells No 3 Conveyor 800
New wheels scraper – 1000
Sand H with screens 3000
Heating system & fix oil oven
gradually fix 445 with ... feed
Motor drive Sand house – 2000



Jany 6/99

Call-Machine

38
60
2281



2000) 7600 (3,8
6000
16000

18 - 22

26000
13000

12500
22
60000
1728) 132000 (76.4
12096
11040
10368
6720

5

140
550
700
700
77000

77000
4000
14000
95000

50
50
2500

550
27
3850
1100
14850

80
50
4000

70

4000
2500
6500

70
60
4200

120

4200
8500
6000
3600
18120

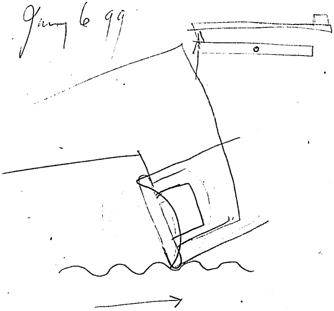
60
60
3600

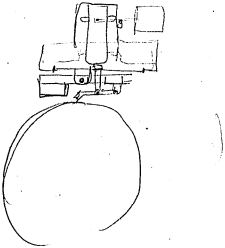
60
80
4800

40

100
50
5000
8000
5000
21000

Jany 6 99





130
16
780
130
2080

140
117
980
140
140
16380

19.8
65
990
1188
1287.0

140
116
840
140
140
16240

140
115
700
140
140
16100

195
4050
7290
810
57950

810
19.8
6480
7290
810
60380

6000
5
30000

11.5

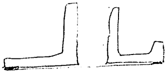
198
6
1188

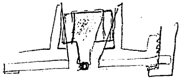
120
15
600
120
1800

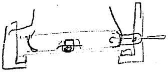
15

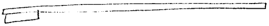
60) 3600

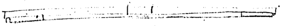
Jany 6. 99

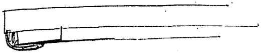


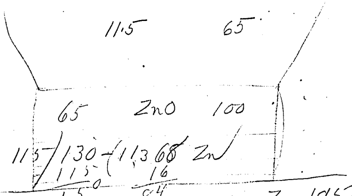












115/130-(1.13 68 Zn
115
150
1.5
115
350
3 5

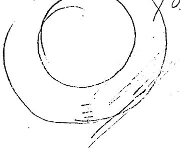
16
84

100 Zn 19.5 Ox
~~157~~
220 "

113
195
565
1017
113
22035

180
65
900
90
1080
117

16.0
65
800
80
960
0.4.

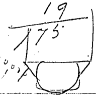


Jany 6/99

100 Zn
~~15.6~~ ~~Oxygen~~
19
175

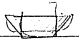
.60
50
300500
1500000
15) 15
6

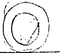
(100,000



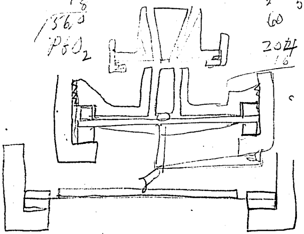
10000

16/130-(8-16





195
8
1560
PbO$_2$



2 5
60
204
16

1500
800
200
60) 2500 (1200-

4c

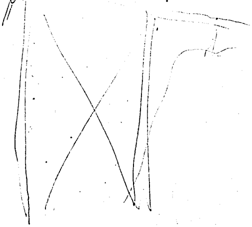
40
40
1600
1200
320000
1600
15) 192000000 (128000
15
42
30
120
120

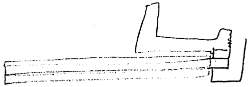
600-
500
15) 300000000 (2
30

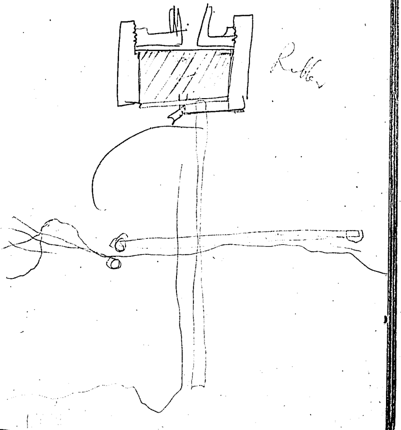
200000
1 3
6000

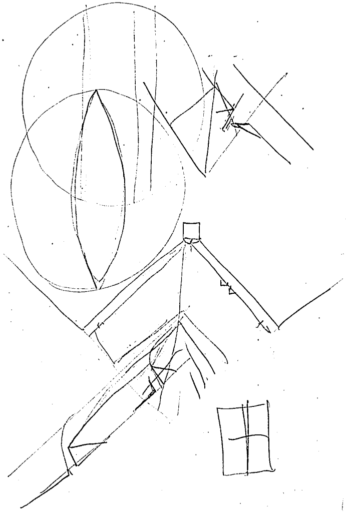
128,000

12800-

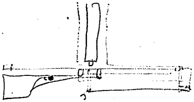


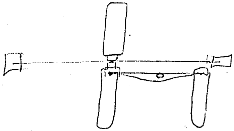


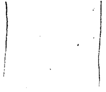


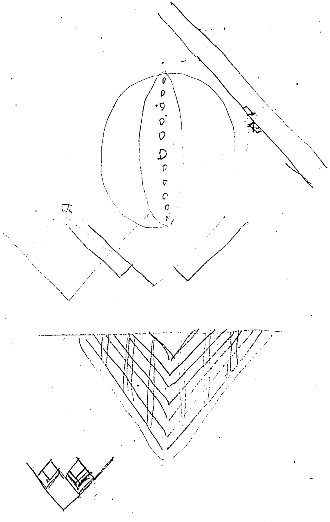


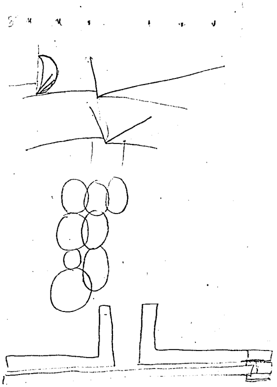
Jany 7/99











60% —

615
234
849

2240
60
13440
458
10752
6720
6196
5352
72.4) 61555
5792
3635
3620
152
(8,50

7

31 14

2755
850
13775
22040
23415

60% — 849 lbs glacial —
615 " Anhydride —

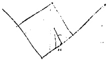
Lixiviation. Bal 15% phos acid
10% anhy

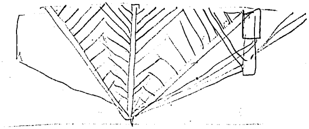
~~average of [illegible]~~
as all lower than 5 B
put bodies in next charge

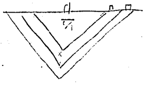
~~1504~~ —

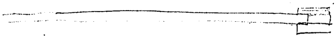
12% of acid locks on
Fluoride Ca — & Carb Ca & Mg

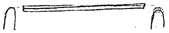
a 60% will require
~~2100 lbs~~ 50 Baumé acid
107 lbs for every 101 lbs [illegible]

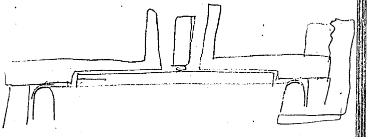


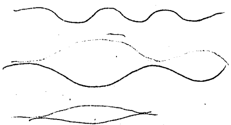








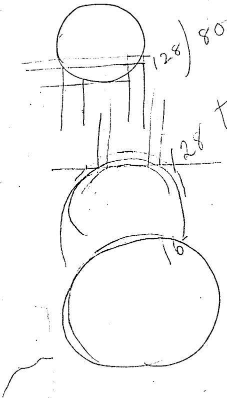


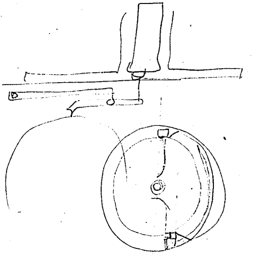


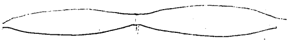
80 | 1000 knots -

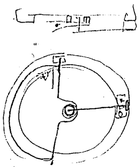
128) 80000 (6

128 to 1

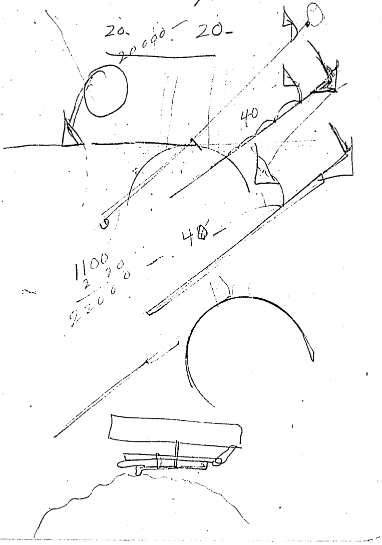




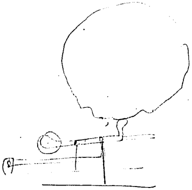


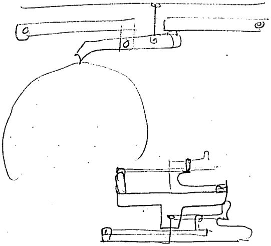


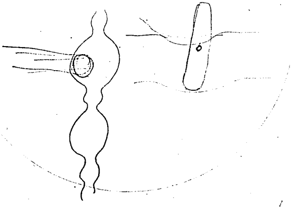
20)16000 — (800
160
20
16000

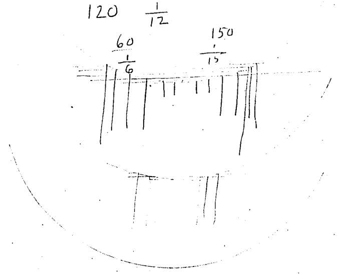


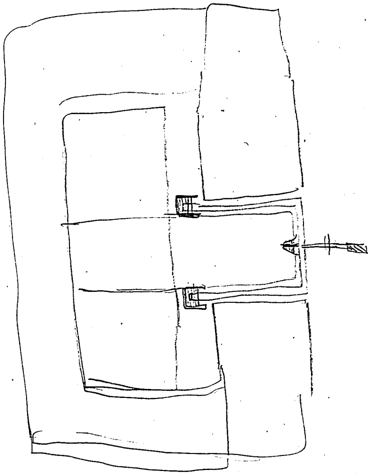
Your worthy president has asked
me to say a few words this
Evening over the telephone.
~~I [illegible]~~ There is
one gift that many men have
which has always been a
matter of wonder to me ~~[illegible]~~
~~[illegible]~~ and that is their
Capability of making a
speech, ~~[illegible]~~
I have tried it once or twice
& the result is that I start
off trembling like a tuning
fork and forget everything I
intended to say ~~and~~
~~[illegible]~~

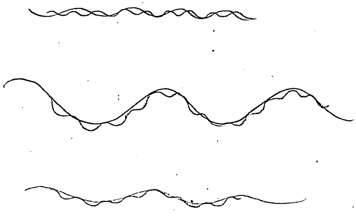







120 $\frac{1}{12}$
60 $\frac{1}{6}$
150 $\frac{1}{15}$





Jany 7 99

1 Very soft wax gives large indentations but no hissing sound or overtones & reproduces loud sounds dull - not large Volume + great disparity between fundamentals & overtones -

2nd as you use a harder wax you do not get such large indentations, the hissing sounds come out clearer + the whole Volume is louder

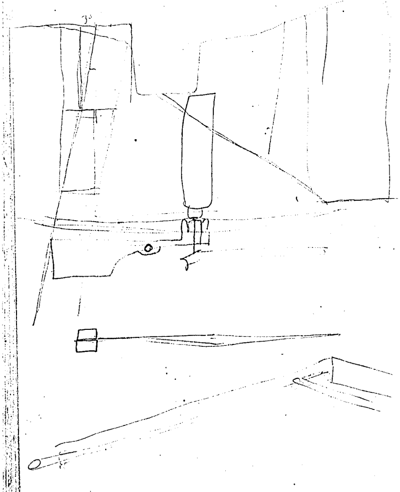
3rd When you get an exceedingly hard cylinder the asperates are abnormally louds Talking is loud + Extremely clear while indentations are faint

not occupying 1/3rd of the 10/1000
but in proportion to indentation
the Volume is great, Music
is not recorded well, because
wax too hard to give any
depth of fundamental / while
for slight depths the apparatus
do the work easily but the power
required as depth increases is
very great -

4th With Regular Wax
Some cylinders showing record
apparently of great amplitude
gives poor volume while
Some showing apparently
shallow indentation give
great volume -

5th Tin gives record which does not occupy over 2/1000 of the 10/1000 yet can be heard all over the room from a funnel -

6 It is evident that when the diaphm is vibrating with great amplitude that the weaker waves have not enough Control of it to check or accelerate it so as to impress themselves on it the stored up power of momentum of the mechanism gets beyond the power of the air chamber Condensations + rarification to Control, Hence it is necessary to limit or reduce the amplitudes to small limits in such a way that it shall not be done by



increasing the weight or rigidity of the parts, so work is done within the mechanism – The mechanism should be very sensitive + yet its amplitude must be checked

30
60
15) 1800000 (120,000
150
30
30

120

120 days

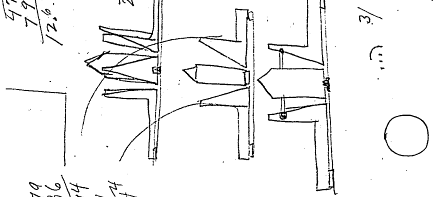
120
3
360

1 yr

26 1/16

79
16
474
79
12.6.4.

79
36
474
237
2844



38.7
12.6
26.1

79
24

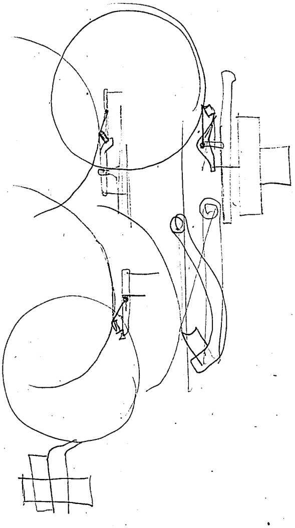
1 79
49
711
316
387.1

79
4
31.6

3/

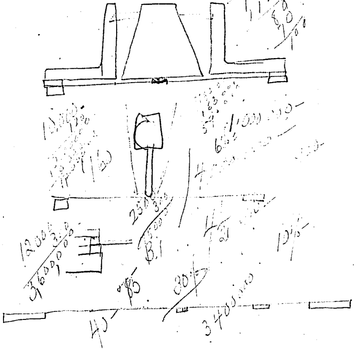
9.
79
9
71.1

2 dia – 1/4 in center. hence Reeds 7/8 long
1/8 at one end 15/1000 at other to bend
one 1/1000 of inch certainly requ 10 milgms
~~75~~ 48 Reeds 480 milgms – 4 1/2/1000 thick
inertia of weight of dia a factor –
If 2 1/4/1000 used + bending load is as to square of
depth – then it will only requ 240 milgms
which is saved entirely (outside of inertia,
which ~~lessening~~ sharpening the sound.



17857-
60
1,071,420

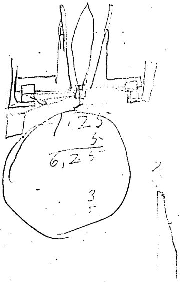
5000
50
9
14) 250000 (17857
11.8
19.2
1,12
80
100

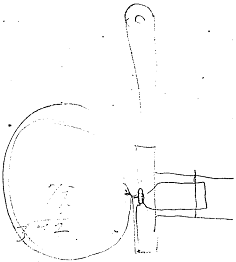


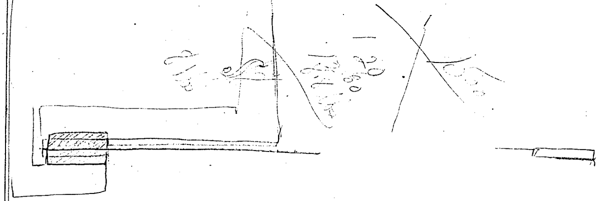
12000
300
3600000

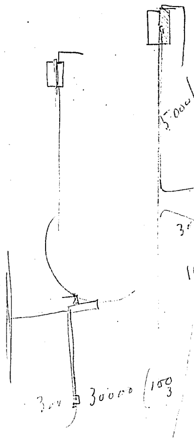
250
300
75000
B.1

85
40
80%
3400000
10%


1,25
5
6,25
3




1500



5000) 25800 (5.1
25000
800

47400
30000 (258
17400
16000
1400
1200
200

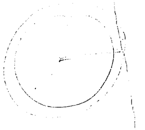
Supt mine = ~~[illegible]~~ –	8	2500
Chemist =	10	3000
Master Mechanic	~~18~~ 15	4500
night m m	8	2500
Supt –	15	4500
night Supt	8	2500
Business manager	15	4500
Chief Engr	12	3600
5 foremen	~~5~~ 3 Each }	15000
5 " nights	5 "	3000
Electrician –	10 "	
	6 "	
Fuel —		

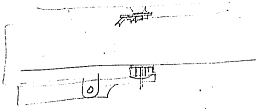
Supt.	4000
Chemist	3000
Mas M	2500
night	1500
night Supt	1500
	3000
Biz –	3500
Chief Eng	1200
10 fore –	2000
	1500
	34800

4000
3500
1200

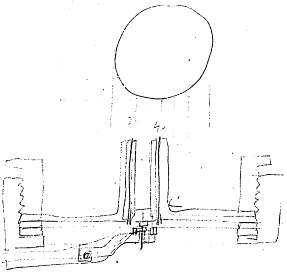
300) 1 (4
3
1

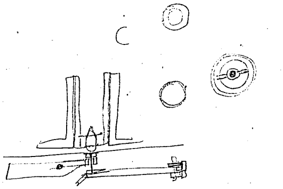
300) 47400 (1
1800

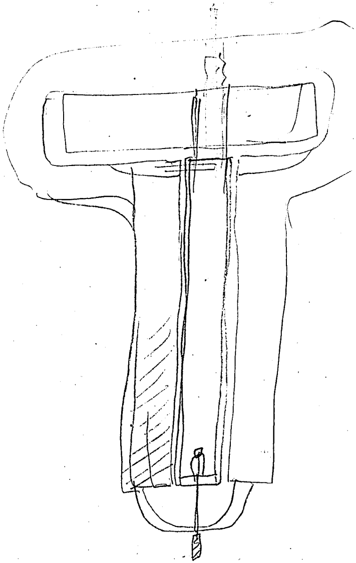


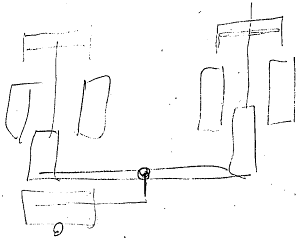


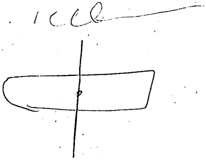
Jany 7/99

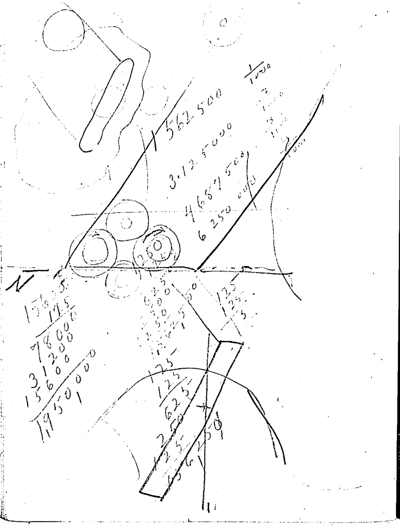











1562500
3125000
4687500
6250000
1/1000
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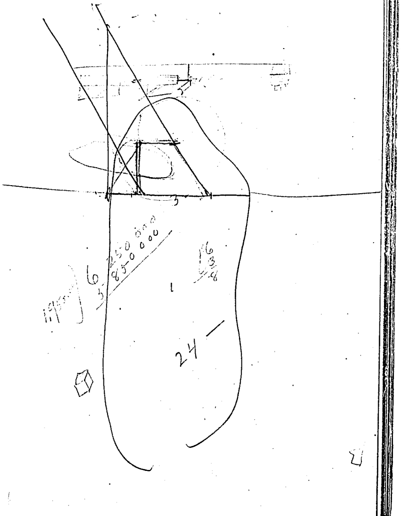
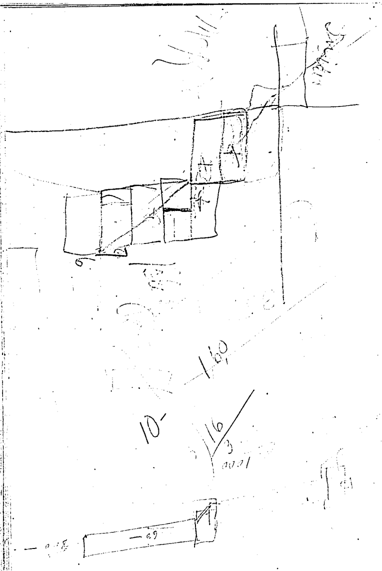
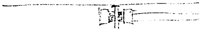
78000
31200
156000
195000
1
125
125
625
250
125
15625

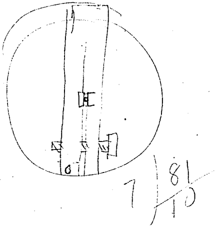
9 Aug 7/99

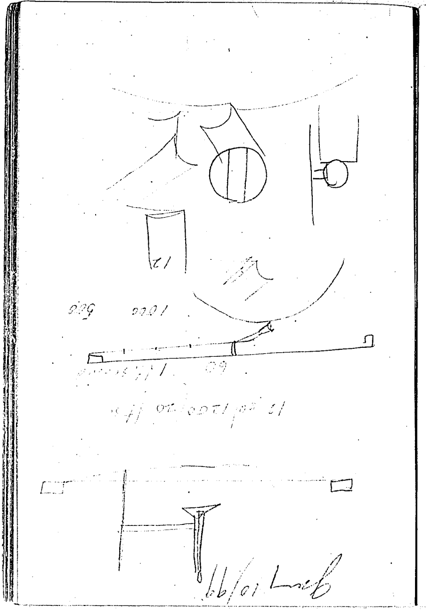

250000
850000
195000



Jany. 7 · 99







30.000.

Suptmin

85
3
25,5

25
300
7500

3750
300
11,25000

5000
5
25.000

75
5...
37.5...

65
5
325

65
300
19500

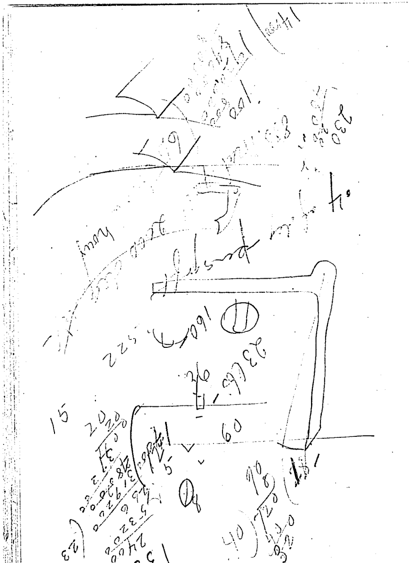
15
5000
75000
300
22.5,000

100
3

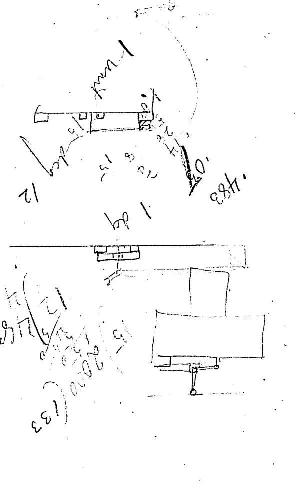
1 60-

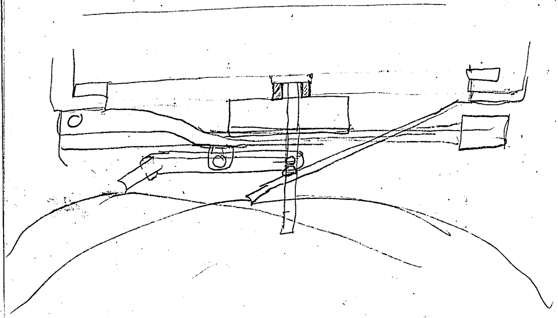
50- 5- 1/2
45 7.5- 3/4
40 10. 1:12
35 12.5-
30 — 15.0
25 17.5-

	m			
50—	50	5	25.00	7.500
45	75	7.5 —	37.50	11.250
40	100	10 —	50.00	15.000
35	125	13 —	65	19.500
30 —	150	17	85	25.500
25 —	175	20-	100- —	30.000

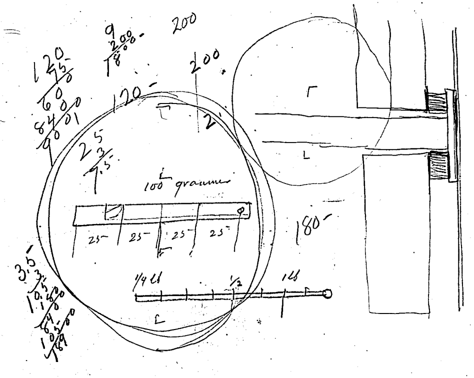

133 units
(23
.222
.14

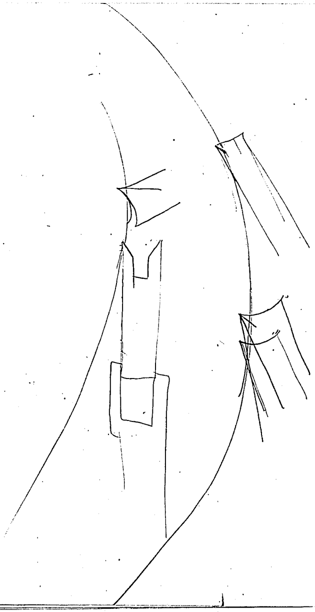
Jany 10/99


1 unit
.07
.483
12
1 deg
(4
2000
(133

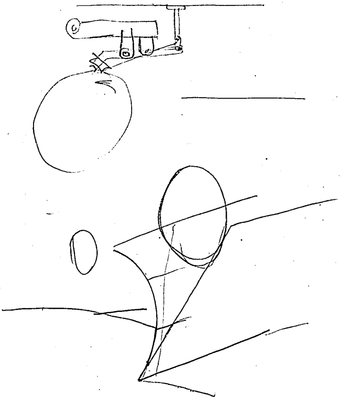


Jany 11/99

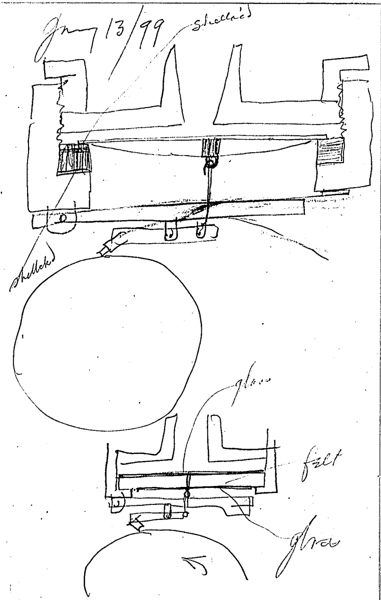

200
200
120
180
2
100 gramme
25
25
25
25
1/4 lb
1/2
1 lb

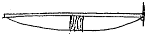


Jany 13/99

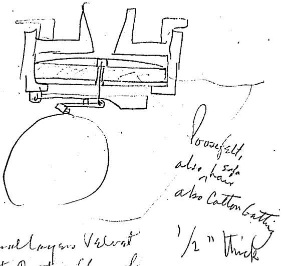


Jany 13/99


shellac'd
shellac'd
glass
felt
glass



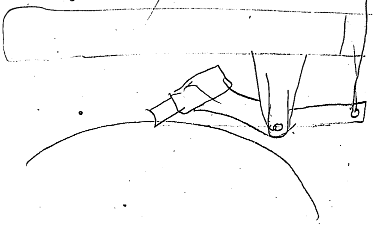
Jany 13/99

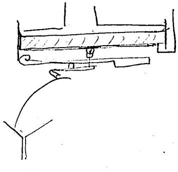


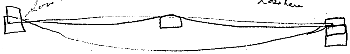
loosefelt, also sofa hair also Catton Batting 1/2" thick or more

several layers Velvet ditto Canton flannel

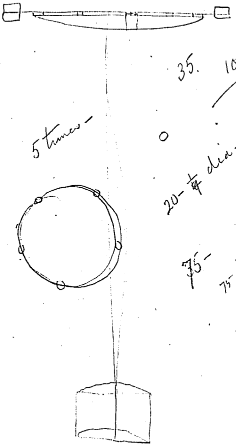
Jany 13/99







Loose here
Loose here



35. 1000 ohms

5 times -

o

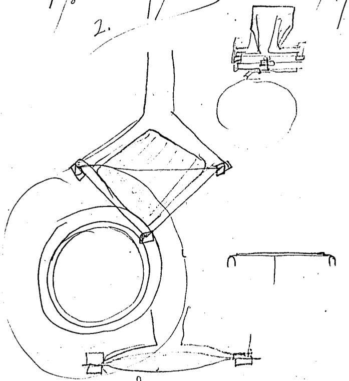
20 - $\frac{1}{64}$ dia - $\frac{1}{8}$ long

75 -

125
3
75) 3.75 (5

1% - 2. 9% out

Jany 14/99



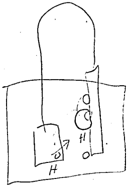
6 7/1000 ohms

$\frac{1}{1000}$ Volt -

$\frac{1}{\text{millionth}}$ of amp

$\frac{24\;2}{1000}$ [illegible]

$\frac{7}{100}$ - 340 -



225-

225

450 1 hour

7 deg minute

		Milamp
.07	07	2000
.14	1.4	1000
28	28	500
56	56	250
1.12	1.12	125
2.24	2 24	62
4.48	4 48	31
8.96	8.96	16
17.92	17 92	8

Jan 14/99

1 volt 1000 - . 1 milamp
1/3rd milamp

1 mily 8 hours

4 amp

150
12
300
55 hours

125
25 grms
11

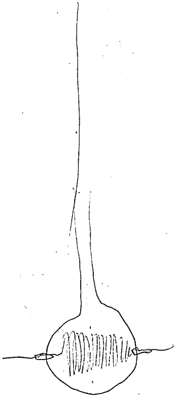
125 mily

40 hour

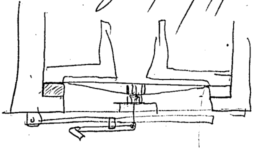
100 hours

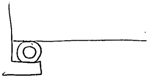
12 milgrms 1 hour

2.36
5
118



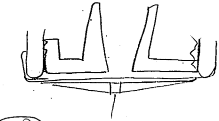
Jany 14/99

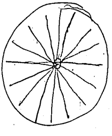




Silk, Rubber cement to close pores

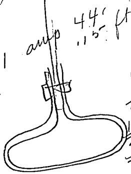
60





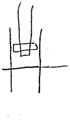
12000 − 3)24000 / 8000 − 1/8 7200 grm

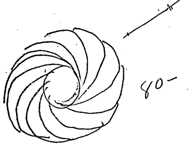
1 Volt − 1 amp 44' .15 ft lb



16
15
80
16
24 3
72

7.2 grammes
pelhour.





80 −

Short

373
7.460
746
671.4

8
746

217
746 −

225
37
1575
675
8,323

225
35
1125
675
7875
14
14
56
14
196

975
975
4875
6825
8775
95,0623

14.75
1475
7375
10325
1030
590
1475
217,5623

225
35
1125
675
7875

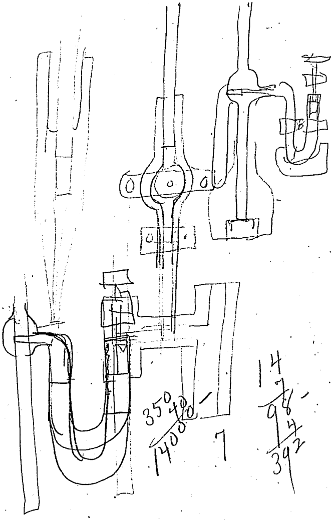
225
8
18,00

5 " 100 50%
8 units in 225 3.6%
10 units in 400 2½% 400

1975
1975
9875
13825
17775
1975
390,0623

10 units.

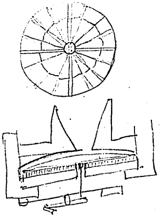
100
0

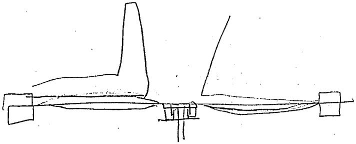


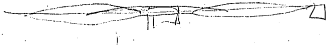
350
40
1400

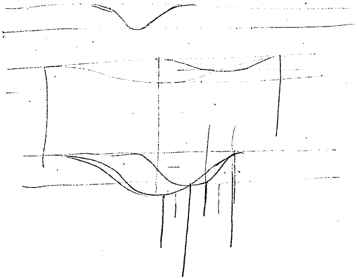
7

14
7
98
4
392

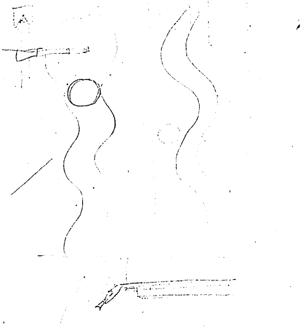






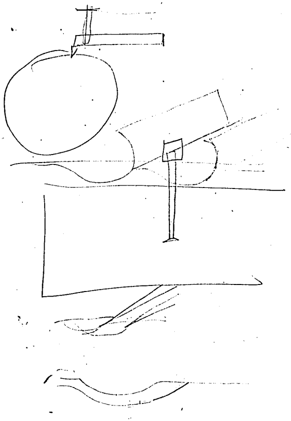


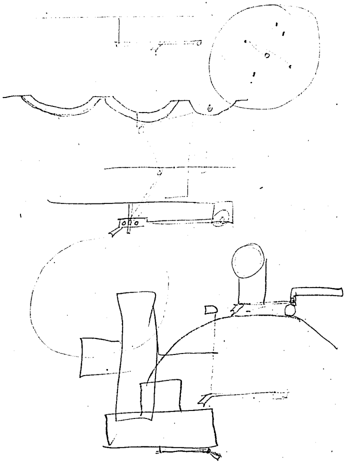
9.4
5 2

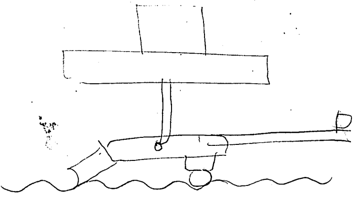


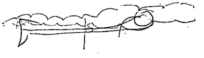
75
162
3-3
45-0

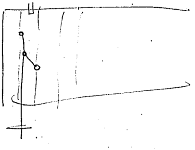
2.5) 750.3

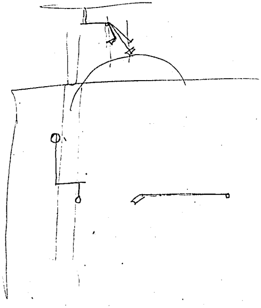


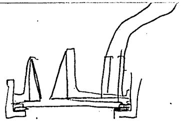


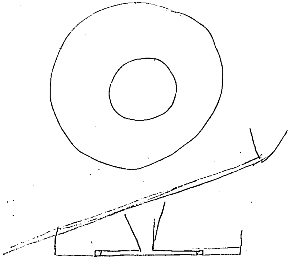






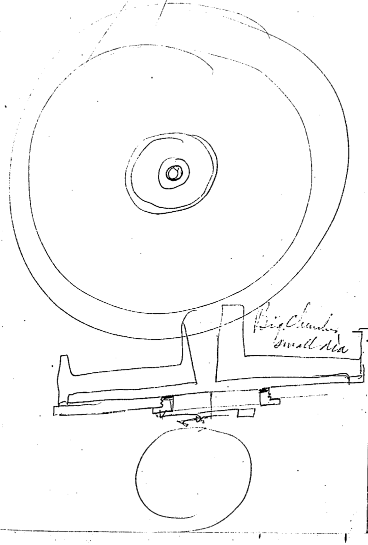




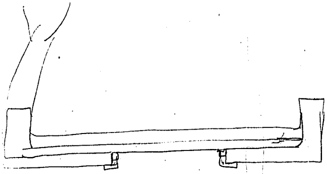


5 $\frac{50}{250}$ - 225

Jan 17 99


Big Chamber
small dia

Jany 1799



Dammar
Ceresin [illegible]
~~Paraffin~~
Beeswax
Japan Wax
Sterate Magnesia

Sterate Magnesia base

Ceresin
Beeswax
Japan Wax
Dammar

Try Making
[illegible]
by [illegible]
[illegible]
[illegible] Chlor[illegible]
[illegible] Magnesia

[illegible] Palm[illegible] base

Ceresin
Beeswax
Japan Wax

PbO_2 — 200
32
232
2
14.60

320
232
88 (10

CO_2

23. $NaNO_3$

100:

50:

232
14
928
232
32,48.

.02 14% —

1 lbs PbO_2 09

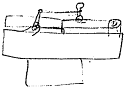
232
20

Makes – 3 oz CO_2 at 2500 temp — moy'h

44

Hence 5 times bulk of air ~~Can~~ be put in —

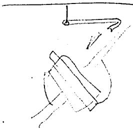
23.

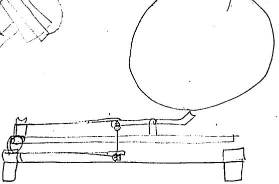


1 lb PbO_2 will burn – 1 oz charcoal — or 16 lbs – 1 lb.

20

$NaNO_3$ – 2½ lbs –





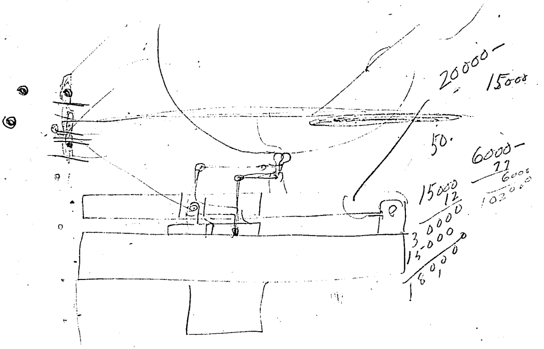
64)774(12.16
64
134
128
10000

525 50 300

1760

1200
1000
1800
3000

45
20
900



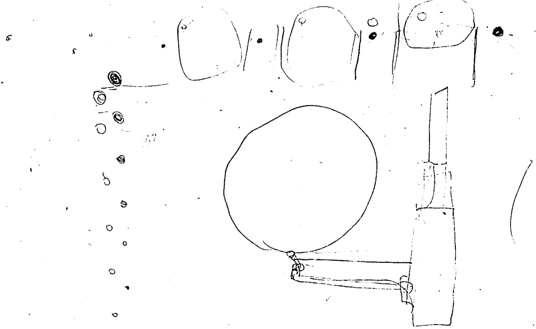
20000-

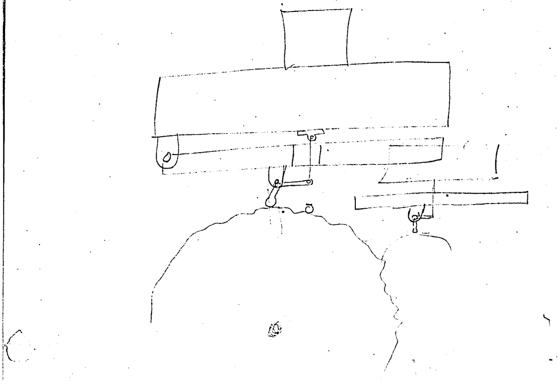
15000

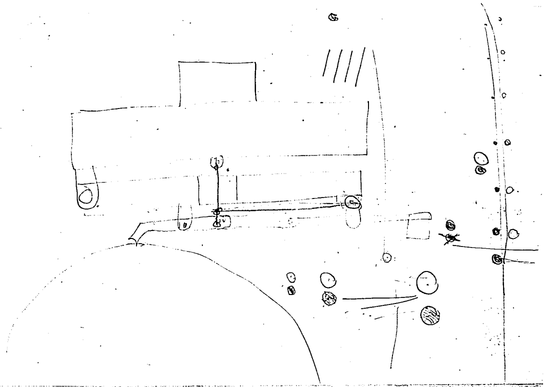
50.

6000-
77
6000
102000

15000
12
30000
15000
180000





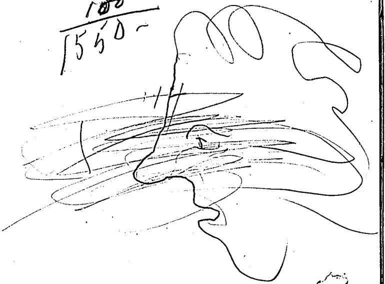


300 }
350 }
150
200 –
50
50
250 –
100
100

1550 –

275 –
80

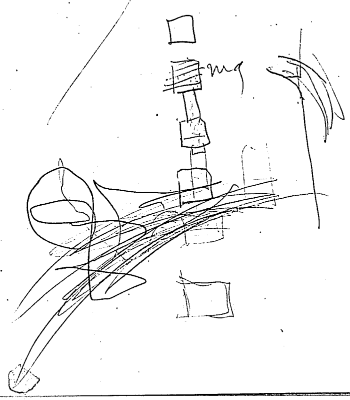
3,55 –

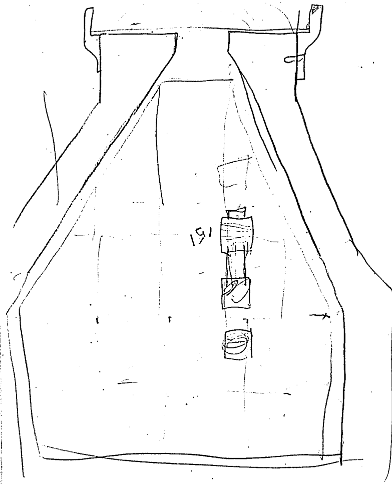


3,50
500
300
150
150
100
50

160 0
50

650 –





4-115 5

3200

68) 1600 (23.5
1360
240

115

$50

$25

60 / 40000000 (666,666
360
400
360

150. $80.

22 / 513

S

Dundeland Can seperate
Swedish ore perfect.
66 iron 30 phosphorus

64) 5000 (lbs —
448 (78.
520

1 sqr inch second is 1 lb min 60 lbs hr

3.78 /
26

1 lb min —

60 — hour

70"

114
50
14000
850) 7000 (4666
6000
1900
1000

13) 100 (
4666 lbs water —
60
8
480 — 10 Hp
45
400 — 10

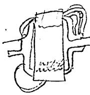
2 ft. 26 ft long
225 lbs
25) 1728 (90
175

1200
17
8400
1200
20400

48) 1536 (3.2 Second
144
96
8 Sqr inch

12
480
32
960
1440
153
600 000
690

14) 600
6



212
5000
1060000

350) 700 000
350
5000
175000
1060000
1691

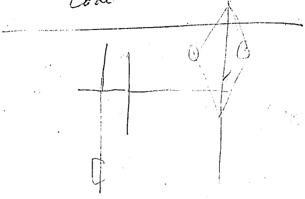
1400) 240000 (171 —
14000
10000
9800
2

150) 2240 (15
150
740
750

275
8
150 2200
10c 22

5000 lbs water at 350 —
Reduced to 212

2 dia 26 ft long
Wt boiler 1600 / lbs
Total 6600 lbs —
to equal — 500 lbs of
Coal & holder —



Saving Reduce temp
Clinker to 1000 + use heat

900 000

Reduce Radiation to 250 000 HU
250

Exit gases reduce
300 deg at 4000 HU per deg

1.200,000

2 350 000

with ash 184 lbs saved
out of 1200 with ash —

14000) 2.350.000 (168. lbs
1 400 000
950 000
840 000
1,12 0.000

16
184 —

184
285
469

150
8
1200

5000
600
3,000,000

2193 000
1 540 00
2160 00
1 8 7 0 00
1,6 2 5 00
2
30

(4340
300
1,302000

1200
469
8) 731 540
91 lbs

50

8) 376
47

14000
50
700,000 - HU

1000 (33.
30

14000) 4 000 000 (285
2 800 0 0
1 200 0 00
1 120 0 00
80 000

4340
300
1,302000

14000) 2 400 000 (171
1 400 0 00
1 000 0 00
980 0 00
20 0

547
171
376

Expulsion of
CO_2 from 4300 ~~320~~ Limestone, 4 440 000
BHU — ~~1,512,000~~
2 688,000

3200 lbs Clinker (1900 CaO)
Equals 800 lbs H_2O
2000 deg 1,600 000 BHU

Radiation at 350 deg
380 BHU ~~per foot~~ $\frac{6}{10}$ ft
1·038 000, BHU

Heat in 1120 lbs CO_2
from Limestone. 550 deg
154 000 BHU

Heat of clinkering assumed 1,500,000

Decomp of Water –
2 ½ lbs Hydrogen – 34000 HU
85,000, HU.

4) 1120
280.
Velocity 9 ~~2520~~ 122 ft min
14000
~~1400~~
140 000
154

8.082.000.
2 900
10,9 82

4) 3200

800
2000
1,600,000

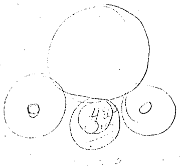
28 ½ lbs Coal
saved for every 100
deg Ht gases 19 –
saved

2193 000
1 512 000
1 600 000
1 038 000
154 000
~~25~~ 00 000
85 000
8082000

25
34000
100 000
100
75
85 0000

.4000
300
1,210,000

18 – 12000 –
5000
7000
60 Tm –



24
14 –

21
10 5 20

1000 21

9000
10000
12000
(30 Tm

1650
1260
960

30
2000
1800

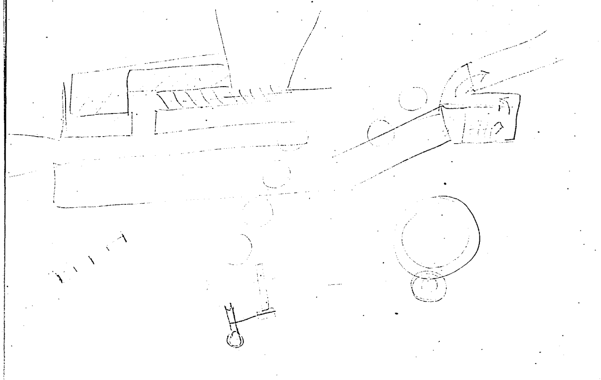
17 500

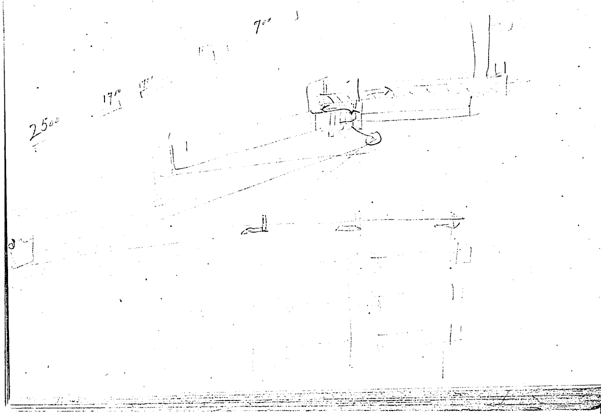
81 – 12 [illegible] 6 [illegible]

1.3 [illegible] 900 deg

6 [illegible] Cabin [illegible] –
10/26 (2300 –

77/2350 (80




25^{00}
17^{0}
7^{00}

50
8
400
8
3200

12
25
60
240
300
912
60
300
360

ft

Big piers 13124 - 9 to 1 360 bbls
CP Eng foundtn - 4000 6 to 1 170 "
Under big piers 3200 - 9 to 1 90 "
arch No 1 S1 KH - 6000 Ex grnd 6 to 1 250 [illegible]
stone lngth 50
200 bbls — 40000 ft [illegible] 2' thick
Mason
Bottom of tunnel 12000 ft - 9 to 1 335 bbls
6 to 1 / 3850 bbls 93000 ft 7 rows flooring
200 Column Stone — 20000 ft
500 bbls
6400 ft wall around Edge bldg ~~9 to~~ 50 to 1 960 bbl

35
25
175
70
875
4375
6125 ~~30~~
65625

250
200
40000
7
280000

262

75
60
4500

2000

35
75
175
245
2625
1

6562
2
3/280
93 / 13124

2

12000

16
5
80

46

350
12
700
350
4200

100
20000

12

1000
20
20000

12
16570
5650—

19,884,000 deg
11 200 000
31,084,000
1701

1650
1657[illegible]

5600
2000
11,200,000

280

[illegible]

Heat for [illegible] 45000

2 tons of CO_2 produced goes off at 1200 deg — 2000 deg

2 ½ tons Clinker

[illegible] Tons air to Combust coal [illegible] 1200 deg

7.4 Tons altogether air Escapes through Regenerator,

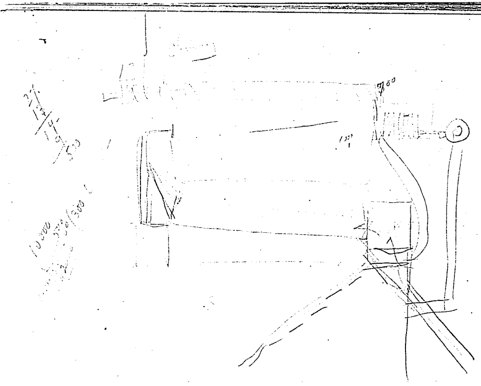
[illegible]

429 lbs required) outside of Energy of Carbon in CO_2 & CaO +

[illegible] of CO_2 of lime & Combustibles, for above

300 lbs [illegible] to [illegible] to make 2 ½ tons product

729—



1000
60
17/60000 | 140
6912

4500
90
18000

9

90

525

691000 (6000 —

.25
6
150

12,525 (44

480

30 - 45
7

3600

19120
211,25
7056,00

1050 — shell
150 [illegible]
100 [illegible]
150 wheels —
60 blower —
200 Regenerator
125 " furnace
60 Stack
130 Central furnace

7995 —

Kiln burning 8 bbls Cement of
400 lbs per bbl per hour —
60 ft long 6 ft dia —

Exit gases 600 deg
" Clinker 2000 deg

Limestone used 4320 lbs
CO_2 in the Limestone 1120 lbs
17 lbs free air per lb of
Carbon

HU — C to CO_2 9.6000
CaO to CaO_3 42.500
H. To H_2O 24,000.

~~Unit 1000 less than above~~

Cylinder & furnace 1640 ft
radiating surface
assumed temp 307 deg
357 BHU per 16/10 of foot
lost per hour when at above
temp — at 350 8% additional
& 8% for every 50 deg added

Present Consumption per bbl of
Portland Cement 150 lbs.
Say 10% ash 135 lbs Carbon

HU in lbs. of Combustible is 1000 less
than gram deg units —

Heat of Combustion 135 lbs C 12960 —
8 bbls
/ 103,680

15120000 BHU —

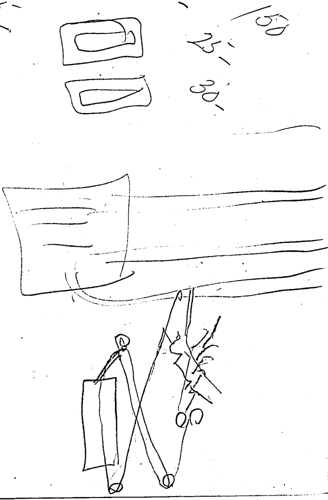
Air used 18360 lbs
which exits with Carbon 19940 lbs at
600 deg fahr assuming
Equals 4985 lbs water
~~2199000 BHU~~ —
2,193000 BHU —
above the atmos
or 540 deg

2193000
154000
2347000

60
60
60
10
15
225

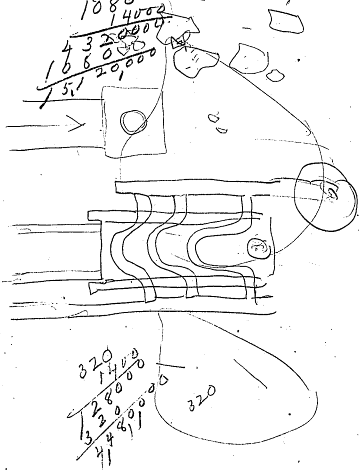
450
225
225

150



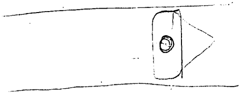
25
30

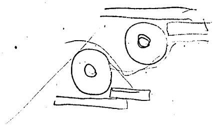
135
8
1080
14000
4 3 20000
1 6 6 0
20,000
1 51

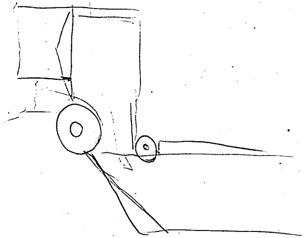


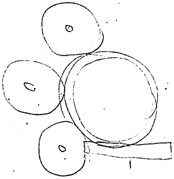
320
1400
2800
1 2 0 0 0 0
1 3 4 8 1 1
41

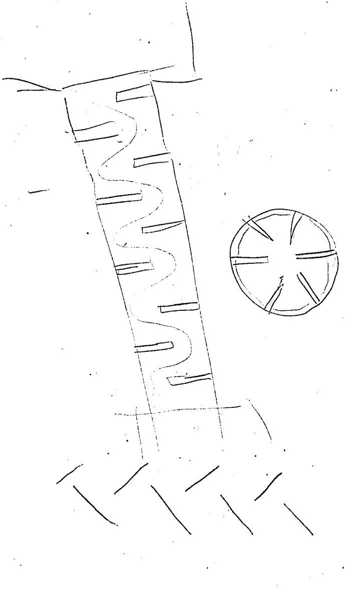
320

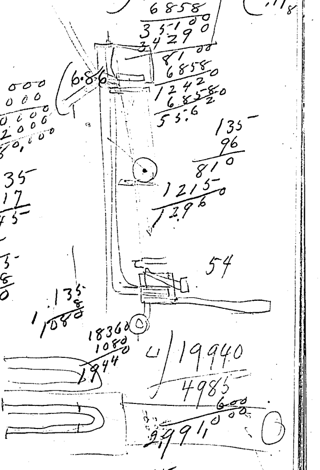












6858) 103680000 (15.118
6858
35100
34290
8100
68580
12420
68580
5556

(4000) 96000 (6.86
84000
120000
112000
80,000

135
17
945
135
2295
18360

135
96
810
1215
12960

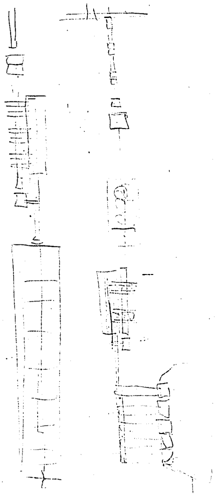
54

135
8
1080

18360
1080
1944

4) 19940
4985
600
2991,000

4985
440
199400
19940
199400
2.193400



1400) 400000 (285
2800
12000
11200
8000

192
14000
768000
192
2688000
4000 HU per degrain

31

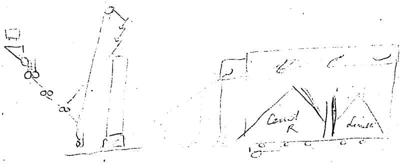
400000
800000
1200000
1600000
2000000

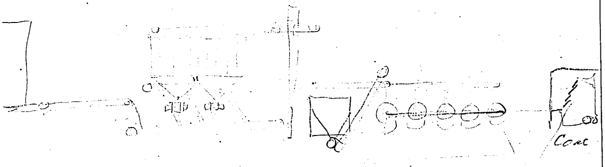
700
800
900
1000
1100

(3986

550) 2193000
1650
5430
4950
4800
4400
4

3200
60
192000

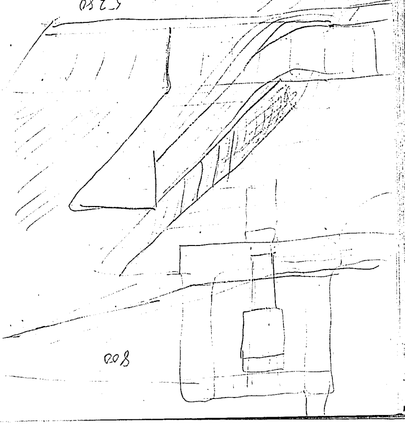

Coal
R
Lime


Conc

Storage-building	20,000.
Engine ~~boilers~~ stacks etc	14000
Main shaft & pullys	4000
	3000
Elec light -	
Oil system - & heating -	5000
Office —	2000
Laboratory —	3500
Cars ~~shops~~	10000
Drills Compressors etc	3500
	65000
	42000
	95000
Shop —	10000
	212,000

25
500
12500

135
14000
540000
135
1690000



5280
3
15840

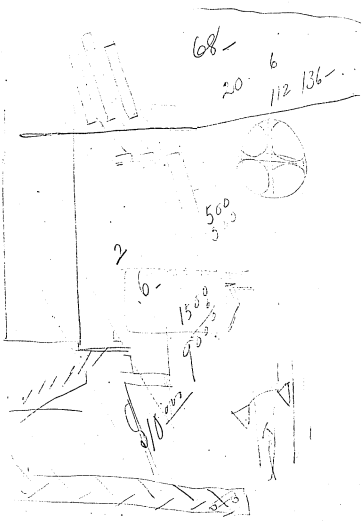
800
33
2640

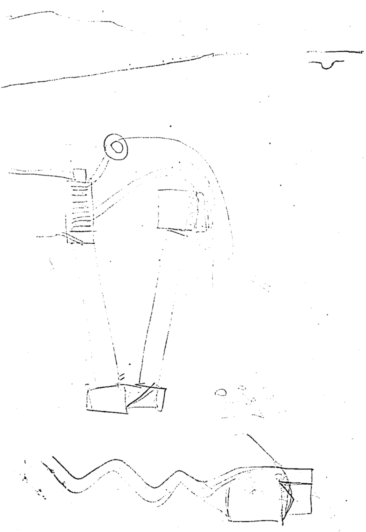
24 ft

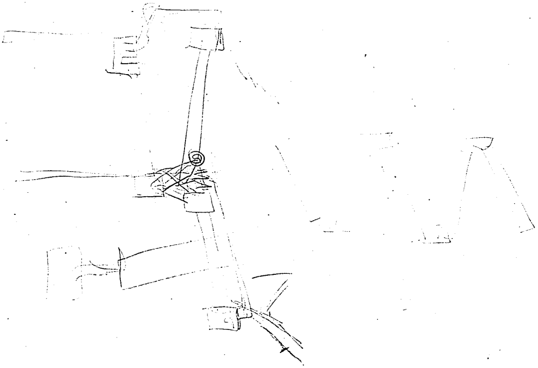
1st 36	3000
Hopper -	500
Track	1000
Rollerfeed	300
Hopper over 1st 36	150
Chuts to 2nd 36 =	100
2nd 36 -	3000
Rollerfeed -	150
Chute to 3rd 36	100
3rd 36 -	3300
Plates for above 3 Rolls nuts etc	750
Boring Lathe for plates -	2000
Jackshaft - & pulleys	1500
Elevator - 1	1800
Dryer —	6000
Jacks	1000
Belt to Stock House	1000
Stock house	8000
Crushing House.	15000
Erecting -	15000
Etc	42650

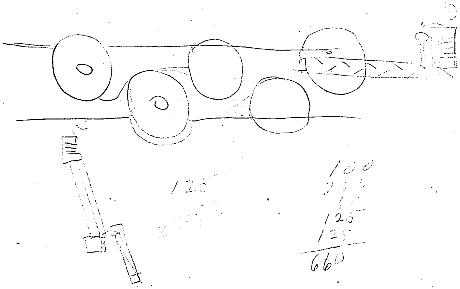
Limestone crusher fine -	
2 3 Highs -	5000
Screens -	1500
Elevator -	1500
Scraper	500
Conveyor -	600
Conveyor to burner	600
Scraper over "	1200
12 Cylinders - Furnace stacks & Regenerators -	30,000
	25.000
Building - Shafting etc Erecting	2000 8000
Cement mill -	
Building	15000
Big Rolls -	3000
3 3 Highs -	6000
Conveyors to Elev	800
Elevator	1500
Scraper	600
Conveyor to storage	1500
Screens —	2000
	95300

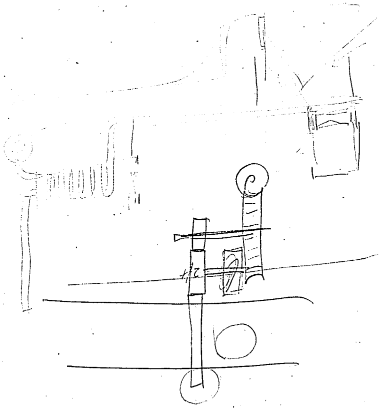
42650
95300
65000
202,950

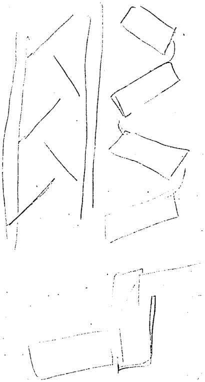

68-
20
6
112 136-
500
7
6-
1500
900
910 00






125
[illegible]
100
[illegible]
[illegible]
125
125
660


2¼



Your worthy president has asked
me to say a few words over the
telephone on this occasion because
he knows that I have a
decided prejudice in favor
of that Boston Institution
~~that~~ he is so proud of —
He knows that I am a
great believer in the methods
of teaching followed by
that institution, for the
reason that for many years
I have had associated with

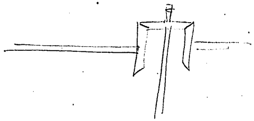
me many young men from various
institutes of learning, and I
can truly say from experience that for
[illegible], High technique ~~and~~
practicability, and immediate
availability in the great industries none Equal
the man from the Massachusetts
Institute of Technology.
I hope you are having a pleasant time of
I wish you [illegible]
[illegible]

14000) 7,658.000, (547
70000
65800
56000
98000
98000

HU 135 C 150 lbs Coal per bbl – 8 bbls

15 120 000 BHU

Heat in Exit gases 540 Fahr above 60 deg.	2,347 000 -BHU
Expulsion of CO_2 from 1900 lbs of CaO	2,688 000
Radiation from Cylinder 350 deg	1,038 000
Heat of clinkering assumed	1.500 000
Decomp H_2O 2½ lbs H.	85 000
	7.658,000



8ft-

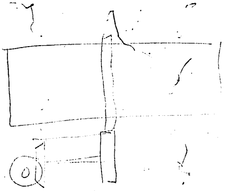
5

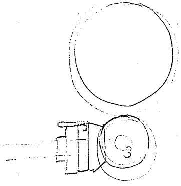
24

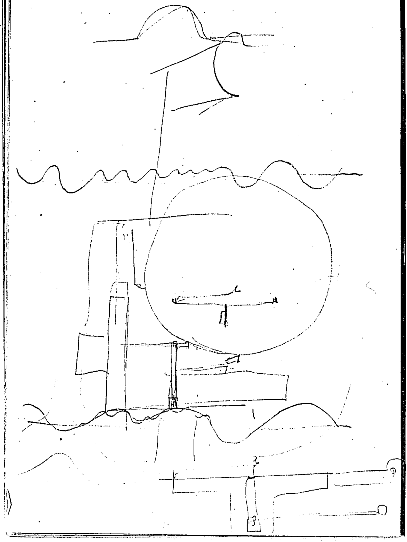
50000

275000
8
2200000

10-







Motor driven

objections –

1 Worm gearing + ~~another~~ higher gearing on account of high speed of motor –

2 20 motors –

3rd Expenses of 20 motors

4 Complication + Libility get out order

5 – Starting boxes for all leading to Expenses + Complication

6 Wear of Expensive Commutator + brushes + high speed bearings

7 Loss of Efficiency in many motors instead of one

Advantages

No stress in gearing at starting – C

capability of increasing or diminishing speed

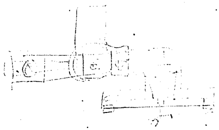
Gears on cooling cylinders -
single shaft -
Consisting of one shaft 500 ft long
with worms every 25 ft. worm wheel
spur pinion Intermediate & spur gear on
cylinder - speed of shaft 200
of " 2 - Shaft center driven by
one motor - 250 ft each way

Objections

1st Shaft very long
2 25 worms & worm wheels -
3 necessity of 25 oil casings.
4 Stress by sudden starting
5 Expense of worms etc -
6 Necessity of 4 inch shaft in size
+ hence big worm -

Advantages

one motor with high Efficiency
Extra stress on starting
Small Expense + little
Complication



$2\overline{)369}$
184.

15.

20

60

40

.70
200
1400
26000
40000

54000 -
26
80

180
50
900
60
5400

60
250
250
360
8620
17800
7500
4000
202950 -

50

120
400
520
50
26000

28
15
0
2
1800

200
120 -
24

25
150
80
1200 -

75
80

320
40
1280
6000
1880

350
25
175
100
875
50

950.

150
50
750

1000

Bigstockhouse	95000
Crusher H	18000
Dryer House	21000
Furnace H	6500
	20000
15 5 H	40000
Blower H	18000
Dust Cone	~~#7~~ 17000
Roasters	80000
Clinker	16000,
5 H Clinker -	30000,
	35000,
Screen	90000
Cement St. R H	

3)469,500
~~156,500~~
3'

560000 -

100 -
45000.

5

5000
20000
15000
156500
90,000
15,000
8,000
20,000
12,000
5000
24,000 -
1000
2000
18,000
20000
12000 -
5000
0,000
~~20000~~
480000

480000
80000
560,000
65,000
50,000
60
735

Rfad	5 –
1st 36 –	15 –
2	20
3	35 –
Elev –	15 –
Shaker	3
Blower fan	3
Exhauster	10
Elev 2	10
Belt –	8
Shaft	15 –
"	8
Extra	20
	167 —

Belt under stock	5 –
2 3 Highs	100
belt under	5 –
Elev	15 –
Scraper	10
Shaft	20
	155 –

Clinker

Roll –	25 –
Scraper	10
2 3 High	150
belt under	5 –
Elev –	15 –
Scrap	10
Shaft	20
Belt to stk	25 –
	260

8 Roasters –	90
Blowers –	25 –
Scraper + Elev	12
Coal Crusher + Conveyor	20
Shaft + worm	40
Big blower	20
	207

167
155 –
260
207
789

25 –
900
225.00
20 –

225
20
450

5 lbs Material
10 lbs water
2 lbs Soda
7 lbs cell-
24 Cell as new
9 lbs prepared cells

11) 75 (7

18 (11

60

67
25
310
124.0
1551

1728 (28
12 4 8
486

28 | 336 (12
28
56
5

18000 ft lbs -

1650) 18000 (10
1650
1500

20) 33000 (1650
20
130
120
100
100

$3 10 hours

50 cents [illegible]

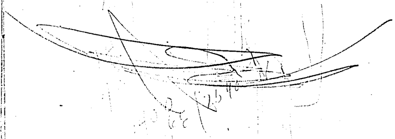
36
80
2880

12

155) 1728 (11
155
178

28
12
56
28
336

1400
380



33

33

3 lbs per drill

420

1 lb Coal heat 40 lbs water
up from 60 to 260,
air 160 lbs. or 2000 cft free air
or for 1 hour 33 cuft min for 1 hour

1 lb. air at 80 [illegible]

4 " air equal 1 water

1 lb charcoal heat 4

800 -

260 | 8000 - 40

200 -

160
13
480
160
2080

50 Mill men
25 Mine
5 Loco —
75 other
155

1.50
1.25
3.75

35
140
1400
3500
49

4 helpers
10 Mac —
6 Boys

2500
5
6
36
3
3
3
3
10
15

175
26
1050
350
4550

~~Mill~~ CP 2500

Mills 35 men —
Oil 1
1 shovel — 460
500
125 —
125
1210

1250 —

Drillers
fire
powder

750
2.00
125
1075 —

250

mill 1 —

3.00
125
230
240
375
140
125
125
150
115
125
125
21.75
175
23.50

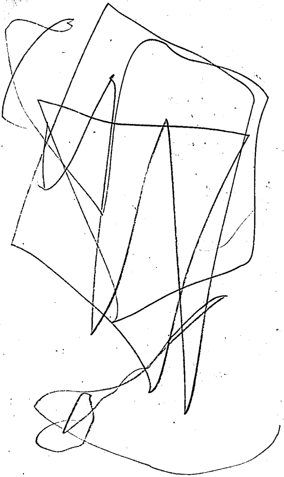
12
10
22

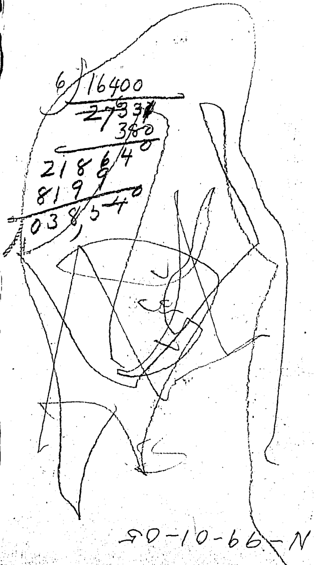
5

11
5
55
6
33.0

$330
90
24

25
6
150
6
90 —





6)16400
27331
380
21864
8191
03854

N-99-01-05